Herculite XRV Ultra composite for anterior and posterior restorations

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Despite the numerous evolutions achieved in dentistry, we still rely heavily in our daily practice on direct restorative techniques.
Resin composites have been used for nearly fifty years, and year after year, improvements are made regarding their composition and handling. Although polymerisation shrinkage hasn't yet been totally eliminated, other problems such as stickiness, consistency and handling have been addressed.

Herculite® XRV Ultra™ is an updated formulation of the Herculite® XRV™, used successfully for more than twenty years, and has been used for anterior and posterior restorations. The main innovations have been with aesthetic properties, consistency and lack of stickiness, that enabled good handling and adaptation to the cavity.

The following paper shows two case reports of posterior and anterior restorations achieved with Herculite® XRV Ultra™.

Case 1 shows the restoration of two class I cavities of a 29 years old patient, using different shades and opacities of Herculite® XRV Ultra™ (A3 Dentin, A2 Enamel, and Incisal). Tooth #36 shows a recurrent decay underneath the amalgam restoration while the second molar (tooth # 37) has initial caries of the occlusal fissure area (Figure 1).

Fig. 1

After making sure through radiographs that caries do no extend interproximally, the preformed 3D-rubber dam OptiDam™ is fixed onto the posterior teeth using the autoclavable plastic clamp SoftClamp™ and with Fixafloss® on the premolars (Figure 2).

Fig. 2

Cavity preparation under rubber dam provides a clear working field for the practitioner, and a complete and safe isolation of the soft tissues of the mouth. Finally, it is more comfortable and less annoying for the patient, and avoids frequent rinsing.

A small tungsten carbide bur (Kerr Beavers Jet bur, Pear shape, FG 330) was used to cut the cavities. Compared to diamond burs, carbide burs generate less vibration that could possibly damage the pulp, and tend to be more efficient at cutting tooth tissues (Figure 3).

Fig. 3

The selection of correct size and shape of the bur results in achieving minimal preparations, preserving sound enamel and dentine as shown in Figure 4 on the second molar.

The two Class I cavities (36 and 37) are restored simultaneously since no contact point reconstruction is involved. They are initially etched with phosphoric acid gel (37% concentration) for 20 seconds (Figure 5).

Fig. 4

Fig. 5

Then the acid is rinsed thoroughly for at least 10 seconds with water/air to remove the acid and the smear layer (excess water is removed, but the surface remains wet) (Figure 6).

Fig. 6

Fig. 7

Fig. 8

A 4th generation bonding system (OptiBond® FL) is used; the primer is first applied using a microbrush and lightly scrubbed for 15 seconds then gently dried. Then the adhesive is applied for 15 seconds (Figure 7) and polymerized for 20 seconds (Figure 8).

A layering technique is employed using small amounts of composite, with the aim of reducing polymerization shrinkage.
The first layer of Herculite® XRV Ultra™ (A3 Dentin) is placed in the bottom of the cavity followed by two other layers of Enamel A2 and Incisal (Figure 9).

Fig. 9

Herculite® XRV Ultra™ displayed good handling properties, and resulted in perfect adaptation to the walls of the preparation. Each layer of composite is polymerized for 40 seconds, using a powerful light curing device delivering at least 600 mW/cm2 (Figure 10).

Fig. 10

Figure 11 shows the restorations before removal of the rubber dam. Filling the cavities using small increments of composite, allows a precise control of the anatomy of the tooth and this reduces the time of finishing the restoration.

Fig. 11

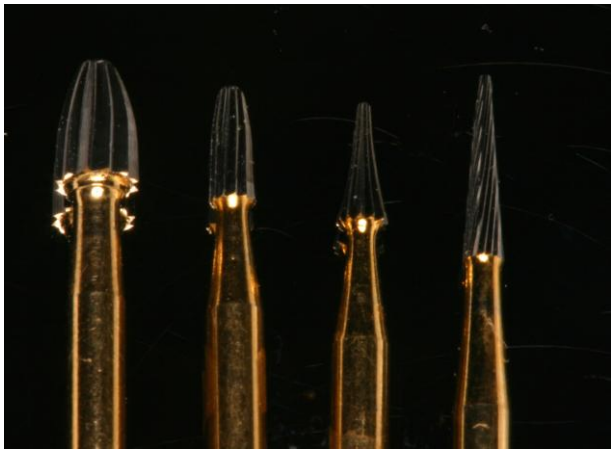

Fig. 12

Finishing and polishing of the restoration are done using different instruments, of varying shapes and sizes, incorporating 12 & 30 multifluted burs (Figure 12). Figure 13 shows the use of an egg shaped multiflutted bur (Kerr Beavers Fine Finishing 30-bladed Jet bur, FG 9406) followed by the use of Occlubrush®, a silicone carbide brush that provides a high lustre and polish of the restoration (Figure 14).

Fig. 13

Fig. 14

After one month, the restorations show a perfect shape and shade integration with the natural dentition (Figure 15).

Fig. 15

Case 2, shows a 32 year-old male who presented for aesthetic concerns in the anterior region. Clinical examination shows a defective incisal edge and mesial Class III restorations, on the 1st and 2nd right incisors (#11 and 12) (Figure 16).

Fig. 16

After shade selection and anaesthesia, the old composite restorations were removed under copious irrigation. OptiDam™ was applied from the 1st right to the 1st left premolar, to achieve adequate moisture control during the restorative procedure (Figure 17).

Fig. 17

Then a translucent matrix is fixed between teeth 11 and 12 and a wooden wedge inserted to avoid over contouring.

Bevelling was performed on the buccal side of the cavities using a coarse diamond egg shaped bur (Figure 18), this increases retention on the enamel surface, and allows better shade integration between composite and tooth structure.

Fig. 18

Etching and bonding procedures were performed following the same steps described earlier in case 1. The build up of the restoration is performed using layers of Herculite® XRV Ultra™, placed in different geometrical aspects, in order to reproduce the anatomy of the tooth. The Comporoller™, a dynamic instrument with non-sticky rolling tips, helps to manipulate the composite, and ensure a perfect adaptation on the buccal wall of the tooth without voids inclusion (Figure 19).

Fig. 19

Each layer of composite is polymerized from facial and lingual sides for 40 seconds.

Finally, OptiDisc® contouring discs with varying grits are used to finish and polish the composite restorations (Figure 20 and 21).

Fig. 20

Fig. 21

Herculite® XRV Ultra™ is a universal composite material, for anterior, as well as posterior restorations. The use of a proven dentine system, combined with an accurate layering technique, will enable the dentist to obtain excellent direct anterior restorations while preserving tooth structure.